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UNITED STATES DEPARTMENT OF AGRICULTURE
Bureau of Agricultural Engineering

MONTHLY NEWS LETTER

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No.2

SAMUEL FORTIER

Dr. Samuel Fortier, retired principal irrigation engineer of the Bureau of Agricultural Engineering and former associate chief of the Division of Agricultural Engineering in the Bureau of Public Roads, died August 17 in a hospital at Berkeley, Calif., his home city since 1918, after an extended illness and a major surgical operation. He is survived by his widow, a daughter, and two sons.

Dr. Fortier was a pioneer in the establishment of irrigation practices in the West, and was one of the members of the engineering and scientific groups that were identified with the development of agriculture in the West. He was closely associated with the irrigation work of the Department of Agriculture since 1903, and continuously from his appointment as chief of irrigation investigations in 1907, until his retirement in August, 1930. In April, 1925, he relinquished administrative duties to devote all his time to research work and the preparation of bulletins designed to preserve the results of his broad experience in the field of his life work. The researches directed by him in his nearly 30 years of Government service have had a profound influence upon irrigation practice both in the United States and abroad.

Dr. Fortier was born in Canada on April 24, 1855; graduated from McGill University, Montreal, in 1885; and received the degrees of Mechanical Engineer in 1896 and Doctor of Science in 1907. He was a member of the Canadian and of the American Societies of Civil Engineers, and honorary member of the American Society of Agricultural Engineers. For a paper on storage reservoirs, he was awarded the Gzowski medal of the Canadian Society of Civil Engineers in 1896.

Prior to his permanent connection with the Department of Agriculture, Dr. Fortier had been professor of civil engineering in Utah Agricultural College, director of Montana Agricultural Experiment Station, and hydrographer for the U. S. Geological Survey. From 1924 to 1931 he was consulting professor of irrigation investigations and practice in the University of California. He was a recognized authority on irrigation, and author of a standard textbook on irrigation practice and of numerous Government and experiment station publications. Those who knew Dr. Fortier not only admired him but loved him, and testify to his high personal as well as professional qualities.

THE UNIVERSITY OF CHICAGO
DEPARTMENT OF CHEMISTRY
RESEARCH REPORT
1950

1. The first part of the report describes the experimental work carried out during the year. The results of the experiments are presented in the form of tables and graphs. The data show that the reaction rate is proportional to the concentration of the reactants. This is in agreement with the theoretical predictions of the law of mass action.

2. The second part of the report discusses the theoretical aspects of the reaction. It is shown that the reaction is a second-order reaction. The rate constant is determined from the experimental data and is found to be independent of the concentration of the reactants. This is in agreement with the theoretical predictions of the law of mass action.

3. The third part of the report discusses the mechanism of the reaction. It is shown that the reaction proceeds via a two-step process. In the first step, the reactants form a complex. In the second step, the complex decomposes to form the products. The rate-determining step is the first step, which is in agreement with the experimental results.

4. The fourth part of the report discusses the effect of temperature on the reaction rate. It is shown that the reaction rate increases with increasing temperature. This is in agreement with the theoretical predictions of the Arrhenius equation.

5. The fifth part of the report discusses the effect of solvent on the reaction rate. It is shown that the reaction rate is higher in a polar solvent than in a non-polar solvent. This is in agreement with the theoretical predictions of the transition state theory.

6. The sixth part of the report discusses the effect of catalyst on the reaction rate. It is shown that the reaction rate is higher in the presence of a catalyst than in its absence. This is in agreement with the theoretical predictions of the transition state theory.

7. The seventh part of the report discusses the effect of pressure on the reaction rate. It is shown that the reaction rate is higher at higher pressure. This is in agreement with the theoretical predictions of the law of mass action.

8. The eighth part of the report discusses the effect of ionic strength on the reaction rate. It is shown that the reaction rate is higher at higher ionic strength. This is in agreement with the theoretical predictions of the Debye-Huckel theory.

9. The ninth part of the report discusses the effect of pH on the reaction rate. It is shown that the reaction rate is higher at higher pH. This is in agreement with the theoretical predictions of the transition state theory.

10. The tenth part of the report discusses the effect of light on the reaction rate. It is shown that the reaction rate is higher in the presence of light than in its absence. This is in agreement with the theoretical predictions of the photochemical theory.

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: All employees who are given authorization to transport and :
: board temporary assistants should submit to this office a request :
: in advance for any traveling that such employees may do. A letter :
: of authorization will then be issued to the temporary assistant who:
: will refer to his authorization when submitting a reimbursement :
: voucher. This method has been suggested by the General Accounting :
: Office and should be followed in the future. The practice of the :
: temporary assistant referring to the authorization of the Bureau's :
: employee who has authority to transport and board temporary :
: assistants should be discontinued. :
: A supply of mimeographed forms "Request for Letter of Author- :
: ization" will be furnished upon request. :
:.....

At the first Southeast Soil Conservation Conference, held at Statesville, N.C., on August 4, L. A. Jones and C. E. Ramser made talks relating to terracing and other methods of controlling erosion. About 300 attended the meeting, including farm agents with delegations from several counties in North Carolina and Federal and State research workers. Arrangements for the meeting were made by J. M. Snyder, Superintendent of the station, and Frank Irons of this Bureau.

C. E. Ramser is in the Washington office engaged principally in preparing a set of instructions for constructing soil saving and check dams for use by the Emergency Conservation Corps.

Because of reduced funds for his project on testing flow around bends D. L. Yarnell has had to discharge all except two of his assistants and to practically suspend tests for the present. The University of Iowa has assigned a graduate assistant to help Mr. Yarnell on computations.

Reduced allotments have also made it necessary to discontinue run-off investigations in Ohio. P.L. Hopkins, who was in charge of this work, was in Washington several weeks working on this report. He has been transferred to Guthrie, Okla., where he will assist Mr. Ramser in working up run-off data.

B. S. Clayton reports that 20 inches of rain fell at West Palm Beach during the first few days of August, breaking local records. At the Belle Glade experiment station the total rain during the storm period amounted to 4.22 inches and all pumping plants in that area were operated to drain the districts.

The engineering work in connection with the construction of a gravel road to the U. S. Sugar Station at Houma is being conducted by B.O. Childs. Funds for the work were obtained by another Bureau from public works appropriations.

A tile drainage system will be constructed under the supervision of this Bureau at the Beltsville (Md.) experiment farm of the Bureau of Plant Industry. G. R. Shier is making the necessary surveys for this system.

F. E. Staebner completed a field trip to investigate irrigation practices and equipment in Ohio, Michigan and New Jersey. Many irrigation plants have been installed during the last few years, indicating the economic soundness of the practice. One irrigator states that times were so hard he could not afford to take a chance on losing his whole crop due to drought. Old automobile engines are being widely used as a source of power for pumps. Mr. Staebner observed the ooze-hose method of irrigation which is comparatively new. Water under pressure is forced into a canvas hose having a closed end and seeps out through the sides, slowly wetting the ground nearby.

H. O. Hill reports that 5.33 inches of precipitation on July 29 and 30 was the first rain at the Temple, Texas, station since early May that will benefit crops, and also caused the first run-off and erosion since that date. The rain was of uniform low intensity and did not cause serious erosion.

On July 19 a rain of 3.25 inches at the Tyler, Texas station caused 9.30 tons per acre soil loss from a gullied, cultivated untterraced area of 5.75 acres according to R. W. Baird. Another area of 1.73 acres protected by a strip cropping system lost 1.31 tons of soil per acre while a third area of 3.6 acres, comparable to the strip-cropped area but protected by a level terrace instead of strip crops, lost only 0.115 ton of soil per acre. The per cent run-off from the strip cropped area was 21.56 as compared to only 7.60 from a level terrace 2,300 feet long.

A rain of 3.30 inches on the Bethany Station is the largest in its history according to A. T. Holman. The ground was saturated by three quarters inch of slow rain, then followed a half inch of rain in 20 minutes causing run-off from all units. Another half inch of rain fell during the next two hours and was followed by one and one-half inches more in the next 45 minutes. The run-off from this rain was large on all terraced areas and large on the terraced areas having corn, wheat and oat stubble. The rates and amount of run-off from terraced areas with clover were quite small.

T. B. Chambers has been added to the staff working on emergency conservation work and assigned to the District Forester's office in Louisville, Kentucky. Five engineers are now engaged full time on the work and nearly all the engineers of the erosion experiment stations have assisted by inspecting nearby camps and making suggestions for proper conduct of work. Much improvement is noted in quality of work done. Mr. Schudy reports the Wisconsin work to be exceptionally good and Mr. Riesbol reports that the camps in Oklahoma are doing good work. In both of these States the technical work is under the direction of engineers of the state colleges and their staffs of technical advisers, including many well qualified engineers. Some States are having to make transfers or replacements to secure engineers with proper training and experience to direct the technical work and perfect a smooth running organization.

An engineering and economic investigation of the debt-paying ability of Imperial Irrigation District and of Coachella Valley County Water District in southern California was begun the latter part of July under

the direction of P. A. Ewing, assisted by H. F. Blaney, J. H. McCormick, and W. W. Weir. This study, made upon request of the Federal Farm Loan Commissioner, is undertaken to determine the soundness of the Land Bank loans within the area as affected by the quality of the soil, the available water supply, flood control, drainage conditions, permanence and safety of essential physical structures, and the ability to maintain successful irrigated agricultural crops.

In the Lower Rio Grande Valley, Texas, an investigation similar to that in Imperial Valley referred to above is being carried on under the direction of Wells A. Hutchins, assisted by Fred C. Scobey, J. C. Marr, and O. A. Paris.

Plans for erecting numerous erosion control structures at seven Emergency Conservation Work camps in Utah were outlined and put into operation by L. M. Winsor, who also conducted a school for foremen and superintendents at each camp, instructing them in the fundamental principles to be applied and followed in building various types of flood control structures. At one camp more than 300 small structures were completed in the first month of work.

The shallow-black-pan evaporimeter used by Colin A. Taylor in studies of irrigation of subtropical fruit in southern California has proven to be an excellent index of transpiration opportunity and is used as a guide for determining the probable dates of irrigations. The records are kept plotted along with the rates of fruit growth on the different plots and extremes in weather conditions are found to have a marked effect on fruit growth. The modifying influence of weather conditions can thus be taken into account in determining the relation of fruit growth to different soil moisture levels.

Current meter measurements and Parshall flume measurements were found to agree within 2 per cent in tests made by R. L. Parshall and Carl Rohwer on the 20-foot Parshall flume installed in a canal near Fort Morgan, Colorado. At the time measurements were made, the flume was discharging 300 second-feet.

R. B. Gray delivered a paper on the relation of farm machinery to cotton production at the Annual Field Day exercises at West Point, Miss. on August 18. While in the South Mr. Gray will inspect the work of the Division on cotton production machinery, control of insect pests, and forage drying.

J. W. Randolph reports that 60 farmers visited Prattville, Ala. on August 14 to inspect the work being conducted on seed bed preparation and with the variable depth cotton planter. Over 400 farmers inspected the experiments on seed bed preparation, planting, and cultivating at West Point, Miss. on August 18.

Excessive rainfall at Jeanerette, Louisiana, has interfered with field work in connection with the forage drying project. Frequent rains prevented wilting the forage in the field previous to artificial drying thus materially increasing the cost of both handling and processing.

G. A. Cumings left Washington on August 23 to inspect the field work in progress on the cooperative fertilizers placement projects in Alabama, Arkansas, Mississippi, Louisiana, Texas, Oklahoma, Nebraska, Ohio and Michigan.

Claude K. Shedd reports that an attachment for corn pickers is under construction for use in an attempt to reduce field harvesting losses. An experimental wagon hitch is also under construction for use in reducing the time required to hitch and unhitch wagons used with mechanical corn pickers.

A. D. Edgar took part in the Annual Southern Aroostook Tour in Aroostook County, Maine, on August 3, and gave a talk on ventilating the farm potato house. Mr. Edgar reports that he has recently assisted two farmers in planning improved potato houses. By insulating the upper part of these buildings so that the space could be used for storage the length of one house was reduced from 46 feet to 36 feet, and of the other from 76 feet to 52 feet, without reducing the capacity. Other features developed by Mr. Edgar's project are also being incorporated in these buildings.